

EXHIBIT 24



US010722159B2

(12) **United States Patent**
Al-Ali

(10) **Patent No.:** US 10,722,159 B2
(45) **Date of Patent:** *Jul. 28, 2020

(54) **PHYSIOLOGICAL MONITORING DEVICES, SYSTEMS, AND METHODS**(71) Applicant: **MASIMO CORPORATION**, Irvine, CA (US)(72) Inventor: **Ammar Al-Ali**, San Juan Capistrano, CA (US)(73) Assignee: **Masimo Corporation**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/791,963**(22) Filed: **Feb. 14, 2020**(65) **Prior Publication Data**

US 2020/0178867 A1 Jun. 11, 2020

Related U.S. Application Data

(63) Continuation of application No. 16/532,065, filed on Aug. 5, 2019, which is a continuation of application (Continued)

(51) **Int. Cl.***A61B 5/1455* (2006.01)
A61B 5/024 (2006.01)

(Continued)

(52) **U.S. Cl.**CPC *A61B 5/14552* (2013.01); *A61B 5/0002* (2013.01); *A61B 5/02416* (2013.01); (Continued)(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,960,128 A 10/1990 Gordon et al.
4,964,408 A 10/1990 Hink et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN 101484065 B 7/2009
CN 101564290 B 10/2009

(Continued)

OTHER PUBLICATIONS

US 8,845,543 B2, 09/2014, Diab et al. (withdrawn)
(Continued)*Primary Examiner* — Eric F Winakur*Assistant Examiner* — Marjan Fardanesh(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear, LLP(57) **ABSTRACT**

A non-invasive, optical-based physiological monitoring system is disclosed. One embodiment includes an emitter configured to emit light. A diffuser is configured to receive and spread the emitted light, and to emit the spread light at a tissue measurement site. The system further includes a concentrator configured to receive the spread light after it has been attenuated by or reflected from the tissue measurement site. The concentrator is also configured to collect and concentrate the received light and to emit the concentrated light to a detector. The detector is configured to detect the concentrated light and to transmit a signal representative of the detected light. A processor is configured to receive the transmitted signal and to determine a physiological parameter, such as, for example, arterial oxygen saturation, in the tissue measurement site.

25 Claims, 7 Drawing Sheets